

## EXHIBIT I



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# Transcript of Paul S. Min, Ph.D.

**Date:** June 12, 2025

**Case:** Phenix Longhorn, LLC -v- Innolux Corporation

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## Transcript of Paul S. Min, Ph.D.

1 (1 to 4)

Conducted on June 12, 2025

	1		3
1	IN THE UNITED STATES DISTRICT COURT	1	A P P E A R A N C E S
2	FOR THE EASTERN DISTRICT OF TEXAS	2	
3	MARSHALL DIVISION	3	ON BEHALF OF THE PLAINTIFF:
4	-----x	4	RODNEY MILLER, ESQUIRE
5	PHENX LONGHORN LLC, :	5	WOMBLE BOND DICKINSON (US) LLP
6	Plaintiff, :	6	1331 Spring Street NW
7	v. : Civil Action No.:	7	Suite 1400
8	INNOLUX CORPORATION and : 2:23-CV-00478-RWS-RSP	8	Atlanta, GA 30309
9	DOES 1-10, :	9	404.879.2435
10	Defendants. :	10	
11	-----x	11	JOHN H. WRIGHT, III, ESQUIRE
12		12	WOMBLE BOND DICKINSON (US) LLP
13		13	555 Fayetteville Street
14		14	Suite 1100
15	Deposition of PAUL S. MIN, PH.D.	15	Raleigh, NC 27601
16	Conducted Virtually	16	919.755.2100
17	Thursday, June 12, 2025	17	
18	11:07 a.m. EDT	18	
19		19	ON BEHALF OF THE DEFENDANTS:
20		20	JEFFREY JOHNSON, ESQUIRE
21		21	BAKER BOTTS
22	Job No.: 586682	22	One Shell Plaza
23	Pages: 1 - 77	23	910 Louisiana Street
24	Stenographically reported by: Judith E. Bellinger,	24	Houston, TX 77002
25	RPR, CRR, CSR-TX, CCR-WA, CCR-NM	25	713.229.1234
	2		4
1	Deposition of PAUL S. MIN, PH.D., conducted	1	A P P E A R A N C E S C O N T I N U E D
2	virtually,	2	
3		3	ALSO PRESENT:
4		4	Ken Lauguico, Planet Depos Technician
5		5	Jonathan Shelnutt, Summer Associate, Womble
6		6	Bond Dickinson
7		7	James Dority, Summer Associate, Womble Bond
8	Pursuant to notice, before Judith E.	8	Dickinson
9	Bellinger, Registered Professional Reporter,	9	Victor Atta-Dakwa, Summer Associate, Womble
10	Certified Realtime Reporter, and E-Notary Public	10	Bond Dickinson
11	in and for the State of Maryland.	11	Parker Hancock, Summer Associate, Womble
12		12	Bond Dickinson
13		13	James Donovan, Summer Associate, Baker Bott
14		14	Noah Harrison, Summer Associate, Baker Bott
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25		25	

## Transcript of Paul S. Min, Ph.D.

2 (5 to 8)

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C O N T E N T S		5
EXAMINATION OF PAUL S. MIN, PH.D.	PAGE	
By Mr. Miller	6	
E X H I B I T S		
(Attached to the transcript)		
Min Exhibits:	PAGE	
Exhibit 1 Declaration of Paul S. Min, Ph.D.,	8	
Regarding Claim Construction for US		
Patent Numbers 7,233,305 and		
7,557,788		
Exhibit 2 United States Patent Number	12	
7,233,305 B1		
Exhibit 3 United States Patent Number	13	
7,557,788 B1		
Exhibit 4 Joint Motion for Correction of	31	
Exhibit B to the Parties' Joint		
Claim Construction and Prehearing		
Statement		

1 not have the -- I have the realtime link, and I  
 2 see nothing going on here.  
 3 Are we typing?  
 4 Off the record.  
 5 (Off the record.)  
 6 MR. MILLER: Back on the record. We're  
 7 ready to start.  
 8 BY MR. MILLER:  
 9 Q Dr. Min, can you, please, state your  
 10 full name for the record.  
**11 A My name is Paul Min, M-I-N.**  
 12 Q And have you been deposed before? Have  
 13 you been deposed before?  
**14 A Yes, I have.**  
 15 Q How many times?  
**16 A I don't have exact numbers, but it is**  
**17 over 50 times.**  
 18 Q Okay. I just want to go, just a few  
 19 ground rules, just for my purposes.  
 20 I'm going to ask you some questions.  
 21 Please let me finish before you answer. I will  
 22 try to let you answer before I ask my next  
 23 question. And this is especially important since  
 24 this deposition is fully remote. And please  
 25 answer the questions verbally. I just wanted to

P R O C E E D I N G S		6
PAUL S. MIN, PH.D.,		
being first duly sworn, was examined		
and testified as follows:		
EXAMINATION BY COUNSEL FOR THE PLAINTIFF		
MR. MILLER: Typically, at least start		
the depositions out with at least introducing the		
counsel, counsel of record.		
I'm Rodney Miller, Womble Bond		
Dickinson, on behalf of plaintiff, Phenix		
Longhorn, LLC.		
MR. JOHNSON: Jeffrey Johnson, from		
Baker Botts, on behalf of the defendant.		
MR. WRIGHT: This is John Wright, on		
behalf of plaintiffs as well.		
MR. JOHNSON: This is Jeffrey again. I		
have with me today James Donovan, Noah Harrison,		
who are summer associates with us at Baker Botts.		
They're just listening in to grade Rodney Miller		
on his performance.		
MR. MILLER: Thank you. Again, I give,		
like, C-minus work, I just barely make it all the		
time.		
But I'll say this: Ms. Bellinger, I do		

1 start by asking, is there a reason today that you  
 2 cannot testify truthfully?  
**3 A Not that I can think of, no.**  
 4 Q Okay. And you're aware that the main  
 5 reason for your deposition, or the reason for your  
 6 deposition today is because you provided a  
 7 declaration in the Phenix Longhorn v. Innolux  
 8 Corporation litigation pending in the Eastern  
 9 District of Texas, correct?  
**10 A That is correct.**  
 11 MR. MILLER: I'll start out and admit  
 12 an exhibit. Do Exhibit 1, the Declaration of Paul  
 13 S. Min, Ph.D., Regarding Claim Construction for US  
 14 Patent Numbers 7,233,305 and 7,557,788.  
 15 Can you please pull that up for me.  
 16 (Min Exhibit 1 marked for  
 17 identification and attached to the transcript.)  
**18 A Mr. Miller, as Mr. Johnson earlier**  
**19 mentioned, I have freshly printed, unmarked paper**  
**20 copies with me, for my declaration and two**  
**21 patents, that I will be discussing today.**  
 22 Q Okay. I'm just going to confirm that  
 23 you don't have any notes written on those, do you?  
**24 A I do not have any notes.**  
 25 Q I'm going to trust Mr. Johnson and

## Transcript of Paul S. Min, Ph.D.

9 (33 to 36)

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	33		35
1	going to speak for everybody.	1	<b>A Certain type of non-volatile storage</b>
2	MR. JOHNSON: We'll keep going.	2	<b>cell would. Not all.</b>
3	MR. MILLER: All right. Let's do it.	3	Q But they can, correct?
4	BY MR. MILLER:	4	<b>A Certain types can, yes.</b>
5	Q Okay. We're going to -- all right,	5	Q As we say "certain types," what do you
6	Dr. Min. We're going to walk through some of your	6	mean by certain type?
7	opinions as it relates to some of these terms that	7	<b>A There are digital memories made from</b>
8	are in dispute in the '305 and the '433 [sic]	8	<b>nonvolatile cells, like flash memories, or EEPROM,</b>
9	patents.	9	<b>that's E-E-P-R-O-M, all in capital. They will</b>
10	<b>A Did you mean '788 patent?</b>	10	<b>10 store digitized information. By that, most</b>
11	Q '305 and '788 patent. Thanks for	11	<b>11 typically, 1s and 0s. But sometimes you could</b>
12	correcting me, if I said it wrong.	12	<b>12 have multi-bit symbols that you can store. But</b>
13	Before I start here, Dr. Min, did you	13	<b>13 information stored, digital representation of the</b>
14	get an opportunity to review the agreed claim	14	<b>14 actual value, or value to be approximated, at</b>
15	constructions by the parties?	15	<b>15 least.</b>
16	<b>A Yes. I saw the list of all agreed</b>	16	Q Dr. Min, I just want to confirm here.
17	<b>construction as well.</b>	17	When you reviewed the specifications of the '305
18	Q Did you review those?	18	19 storage cells -- let's look at your discussion in
19	<b>A Yeah.</b>	19	20 paragraph 30.
20	Q All right. Do you have any -- do you	21	I want to confirm here. Are you
21	agree with the parties' agreed constructions?	22	22 referencing the embodiment in the specifications
22	<b>A I have not really spent time to analyze</b>	23	23 here, when you say this specification explicitly
23	<b>my interpretation with regard to the agreed-upon</b>	24	24 identifies the memory elements as programmable
24	<b>constructions. So sitting here, I have no opinion</b>	25	25 analog floating gate memory cells 330 through 337
25	<b>to offer.</b>		
	34		36
1	Q Are you aware, by any chance, that the	1	and analog storage cell?
2	parties' agreed constructions with the	2	<b>A It's paragraph 32 or 37?</b>
3	exception -- sorry, are you aware that the	3	Q I'm looking at paragraph 30.
4	parties' agreed constructions, as it relates to	4	Paragraph 30.
5	the '305 patent, they come from the Court's prior	5	<b>A Yeah, so in paragraph 30, I'm referring</b>
6	claim construction order in the Wistron	6	<b>to what is described in the specification.</b>
7	litigation.	7	Q And when you say "what is described in
8	<b>A That is my general understanding, but I</b>	8	8 the specification," are you referring to an
9	<b>have no specific terms that comes to my mind.</b>	9	9 exemplary environment that's in the specification?
10	Q Let's talk a little bit about	10	<b>A That would be correct. In this</b>
11	nonvolatile storage cells.	11	<b>11 paragraph 30, that's what I'm talking about, yes.</b>
12	Do you teach -- in your classes at	12	Q Also in paragraph 31, that's an
13	Washington University, St. Louis, do you teach any	13	embodiment, correct?
14	classes that discuss nonvolatile storage cells?	14	<b>A Once again, I'm describing here, in</b>
15	<b>A Yes, I do.</b>	15	<b>15 paragraph 31, what is stated or described in the</b>
16	Q What are nonvolatile storage cells,	16	<b>16 embodiment as a practicable specification.</b>
17	Mr. Min?	17	Q We're going to jump to paragraph 34.
18	<b>A Nonvolatile means the data stored in</b>	18	This would be page 14 and page 15.
19	<b>the cell stays on, even if you remove the power to</b>	19	<b>A Yes.</b>
20	<b>the cell. And "cell" here is a general term to</b>	20	Q I'm just trying to get a general
21	<b>describe the context of memory, of course.</b>	21	understanding of your positions in paragraph 34.
22	<b>Something that stores a certain amount of</b>	22	<b>A Yes, I have this for you, paragraph 34.</b>
23	<b>certain information.</b>	23	Q Can you explain paragraph 34 to us?
24	Q Can a non-volatile storage cell be	24	<b>A So, if the nonvolatile storage cell</b>
25	designed to store digital information?	25	<b>was -- I'm still describing the embodiment that's</b>

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	37		39
1 shown, for example, in Figure 3 of the '305 2 patent. 3 So, nonvolatile storage cell in 4 question, the numeral 330, 331, to 337, and here, 5 if this nonvolatile storage cell, 330 through 337, 6 were digital memories, like a flash memory or 7 EEPROM, then the values there would be some -- as 8 some binary numbers, 10110. If that comes out, I 9 cannot only drive or go through the drive of 340 10 and then through driver 347, respectively, and 11 then drive is a channel 0 through channel 7, 12 connected to the panel.		1 were digital memory cells, such as flash memory or 2 EEPROM then they would go to driver and then 3 become this channel output, CH0 through CH1, and 4 connected to the panel. And that the claim 5 language says the drivers connected to said 6 storage cell, that would not work. And drivers do 7 not take 1s and 0s, you take a value, and then the 8 value, that value is the actual voltage value, and 9 that goes into the driver and gets connected to 10 the panel. So that would not make sense.	
13 You cannot drive the display panel with 14 1s and 0s. You need to have a voltage. And to do 15 that, if these memories -- the storage is a 16 nonvolatile storage cell, 330 through 337 were 17 outputting 1s and 0s, you could not fully drive 18 that panel through this reference correction. 19 You'll need conversion of this digital values to 20 analog voltage value to do that. And here, what 21 I'm saying is, there is no description, and here, 22 this channel 0 through channel 7 on Figure 3, just 23 to take it back to Figure 2, in Figure 2, the 24 channel zero through channel 7 are shown two 25 places, gamma reference controller 210, and gamma		11 Q All right. So are you reading the 12 claim language, and we'll talk about this later, 13 but, I mean, we can talk about it now. Is your 14 interpretation of this based on the fact that when 15 it says "drivers connected to said storage cells," 16 there has to be some direct connection?	
26 reference controller 220. And channel 0 through 27 channel 7, in both cases, gets connected to a 28 source driver that is attached to the TFT panel 29 280, without having any gateway converter, and 30 this would not work. Therefore, the values stored 31 in nonvolatile storage cells were digital values.	38	17 A Yes. That is correct. 18 Q So we can't -- it can't connect to 19 something through something else? 20 A Not -- no, not in the context of the 21 '305 patent and '788 patent, no. 22 Q We're doing two things at once. We're 23 talking about the storage. We are talking about 24 drivers connected to said storage cells. 25 So let's pull up -- I just want to know	
7 Q All right. I got that. 8 And then you go on and say, so this 9 configuration, I'm assuming that you're talking 10 about, from what you're speaking here, figures in, 11 saying in the exhibits, the patent exhibits, you 12 say "This configuration would contradict the 13 explicit language of claim 1, which requires 14 'drivers connected to said storage cells'." 15 A I'm sorry, which paragraph are you 16 reading, please? 17 Q I'm on the last sentence of paragraph 18 34. 19 A 34. Okay. 20 Q Yes, sir. 21 A Yes. That's correct. 22 Q And can you explain what you mean by 23 that, by that last sentence in paragraph 34? 24 A That's what I just said. If 25 nonvolatile storage cell 340 -- or 330 through 337	40	1 if you consider -- 2 We'll pause that. I'm going to go back 3 to that "drivers connected to said storage cells." 4 I'm jumping around here. Trying to keep the 5 record a little cleaner. 6 It's nice. All right. So let's pull 7 up, so you had your position on drivers connected 8 to said storage cells. So, it's your position it 9 had to be connected, it can't be through 10 something. 11 Have you considered, in the '305 12 patent, claim 8, just the language of claim 8, 13 where it says an output pin connected to an output 14 pin through a second multiplexer? 15 A If this is a claim 8 -- 16 Q Yeah, last -- 17 A Claim 8. I read that. 18 So in this case, it is explicitly 19 stated that the connection has something in 20 between. So it makes it clear. But when it comes 21 to describing this particular -- the configuration 22 as stated in the paragraph 34, the last sentence, 23 that -- there, here, it's actually -- and the 24 specification directly says that. The 25 specification says this.	

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	41		43
1	I'm going to refer to '305 patent.	1	A I mean, I read claim 8 also.
2	Part of the paragraph that starts at line 46,	2	Q I'm asking you, did you consider -- did
3	column 1, regarding Figure 1. And here, the last	3	you consider the use of "connected to" in your
4	part of the paragraph, starting from line 57, you	4	analysis of connected to --
5	know, we're talking about all this -- the	5	MR. JOHNSON: Objection.
6	connection made it to the -- this is GM numbers,	6	Q -- in claim 1?
7	and the last sentence says "Since the loading of	7	MR. JOHNSON: Objection. Form.
8	the source drivers 110, 111, 112, changes	8	A Yes, I have considered the patent as a
9	dynamically, it is not possible to simply connect	9	whole, including all claims.
10	10 the resistive divider," all the resistors listed,	10	Q And we are -- the claim language is "is
11	11 "to the inputs of the source drivers," and then it	11	connected to" and "is coupled to." But throughout
12	12 says some type of buffering on -- used, "such as	12	13 the patent, there are numerous source descriptions
13	13 the gamma reference for ICs 170 and 171."	13	says something is, something connects to
14	It's just a cell. Simply connect means	14	14 something. So, as opposed to something -- A is
15	just connected. This is with regard to Figure 1,	15	15 connected to B, there are numerous places that
16	16 the prior art embodiment. Just making the	16	17 says B connects to A, in direct form. And
17	17 connection there is not going to work; you have to	17	everywhere it is stated that way; the description
18	18 have some kind of intermediate. This make it	18	19 is consistent. When something connects to
19	19 really clear, when the patent describes something	19	20 something else, or something is connected to
20	20 is connected to something else, that means making	20	21 something else, in both cases, the connection is
21	21 the connection directly, not anything between.	21	22 direct connection.
22	In contrast to claim 8, you just	22	Despite the fact that claim 8 says A
23	described, explicitly explained that the	23	23 connected to B through C?
24	24 connection has something in between. So that	24	A Well, as I just mentioned, A is
25	25 makes it clear.	25	25 connected to B through C, as an in-between through
	42		44
1	Q So claim 8 says an output pin connected	1	C. So that means A is connected to C, which is
2	2 to an output through something else.	2	connected to B. That's what that statement is
3	And you're stating that that language	3	saying.
4	4 contradicts your position where you're saying that	4	Q All right, Dr. Min. We'll be going
5	5 connected to has to be directly --	5	back and forth on that one.
6	A No.	6	All right. Let's go back to your
7	Q -- to connect?	7	statement in the nonvolatile memory, in
8	A No.	8	paragraph 35 on page 15.
9	Q You don't think?	9	I'm trying to understand your position
10	A No, it does not. What this last	10	10 here. You say the integrated circuit of claim 1
11	11 limitation of claim 8 is saying is, and it says	11	11 wherein said nonvolatile storage cells hold analog
12	12 output pin is connected to a second multiplexer	12	12 voltage values, you're referring to claim 4?
13	13 which is, in turn, connected to an output. That's	13	A Yes.
14	14 what the -- what this sentence you just read from,	14	Q All right. So isn't -- claim 4 is a
15	15 claim 8, you're referring to. When it says "an	15	dependent claim of claim 1, correct?
16	16 output pin connected to an output through a second	16	MR. JOHNSON: Objection.
17	17 multiplexer," that means output pin connected to a	17	A Yes. That's correct.
18	18 second multiplexer, which is connected to an	18	Q And claim 4 explicitly states that the
19	19 output.	19	19 nonvolatile storage cells hold analog voltage
20	So that's exactly what I said. When	20	20 values.
21	there's a -- the sequence of connection, that's	21	I'm trying to understand how you are
22	exactly what the claim language is describing.	22	22 looking at this to form your next statement here,
23	Q So in your analysis of the drivers	23	23 that you say that this explicit statement, that
24	24 connected to storage cells, did you consider the	24	24 the cells hold analog voltage (indiscernible)
25	25 language in claim 8?	25	25 dictates the interpretation arrived in claim 1?

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	53		55
1 construction is to say one or more circuit that is 2 selectively coupled, and you say selectively 3 coupled a multiplexer or selectively coupled a 4 demultiplexer?		1 Does the multiplexer, does it have some type of 2 functionality that allows a selection of those?	
5 A So the coupler is either doing the -- 6 number 1 or number 2, right? So that's what 7 the -- that's what the -- the proposed 8 construction in the Phenix's proposed construction 9 says. You can couple, according to number 1, as 10 shown in this construction, or according to number 11 2.		3 A Yeah, yeah. So within the confine of 4 one particular multiplexing function, you can 5 dynamically get a generator pattern of the 6 multiplexing. So I wouldn't call it a selectivity 7 coupling. I would say dynamic control, or 8 sometimes called dynamic multiplexer. You do that 9 in real time. So you can do that.	
12 But you also added -- the Phenix also 13 added selectively, in other words, a multiplexer 14 device can do one of these two, depending on what 15 you select the device to do. That does not 16 happen. There's no multiplexer that does that. 17 And --		10 Q All right. Thank you very much.	
18 Q I thank you very much, Dr. Min. We'll 19 probably have a conversation with your counsel 20 about that. Because I don't think we -- I just 21 want to get from you is, do you agree that a 22 multiplexer -- again, does a multiplexer have some 23 type of selecting functionality?		11 All right. Dr. Min, we can jump to the 12 '788 patent. We're jumping to page 33.	
24 MR. JOHNSON: Objection to form.		13 Talk about your opinion on gamma 14 reference control capabilities.	
25 A Selecting function with regard to what	54	15 A Yes.	
1 mode it is doing the multiplexing or 2 demultiplexing, that selection does not exist.		16 Q In your opinion, what is the '305 17 patent directed to?	
3 Q So it is your opinion that the 4 multiplexer, this is the multiplexer when it goes 5 many to one, it has no type of selecting 6 functionality in it to decide which many to one in 7 the multiplexer?		18 A '305 patent is generally directed to, I 19 think, the gamma correction on a TFT panel, but in 20 some very particular way. And it criticizes as a 21 background prior art existing. And this is part 22 of the background. And then it also criticizes 23 some of the -- contemporaneously, at the time of 24 the '305 patent, some digital-based approach.	
8 A No, that's not what I am saying. 9 Because it is a selectively coupled. It's 10 selectively on the couple. And the coupling is 11 either one or two, right? You list option 1 or 12 option 2. That's what the construction says. 13 You either -- you couple it according 14 to 1 or you couple according to 2. And then --		25 Which involves a number of additional	
15 Q No, I'm not -- Dr. Min, I'm not asking 16 about the construction. I'm asking about, 17 generally, multiplexers and the functionality of 18 multiplexers. I'm asking you to get an 19 understanding of, you have many to one, are we 20 talking about multiplexer or are we talking about 21 demultiplexer, one to many? Within that 22 multiplexer, is there some type of functionality 23 that allows it to select from that many to one?		1 components. So it -- at the end -- this is column 2, starting from about line 7, so the previous 3 conventions. And this is what the sentence is 4 saying: Both inventions teach quite complex 5 digital approaches to this analog problem, so 6 "analog problem" being the gamma correction, the 7 voltage applied as analog value.	
24 So, you have -- say you've got four 25 going in and it's coming out with one of the four.		8 So -- and then the -- both of the 9 previous prior art was extensive. So what line 10 10 of column 2 is designed to gamma reference 11 architecture that automates gamma adjustment and 12 provides programmable capability and achieves 13 acceptable cost. And this acceptable cost comes 14 from not utilizing this digital approach to the 15 analog problem, which is the gamma correction.	
		16 Q And what about the '788 patent?	
		17 A I mean, it's a very similar, but not 18 identical -- identical -- I didn't do, like, a 19 line-by-line comparison, but the specification is 20 very similar. Here, the independent claim recites 21 to calibration of liquid crystal drive, and then 22 using the gamma correction. And, once again, 23 utilizing this analog, the storage cell, and then 24 you have the optical sensors that's, basically, 25 feeding back the correction.	

## Transcript of Paul S. Min, Ph.D.

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	57		59
1 <b>So, that's what '788 patent is.</b>		1   I have Figure 3.	
2   Q All right. We're looking at the '788.		2   You reviewed Figure 3, Dr. Min?	
3   We're in the '788 patent here. I'm going to go		3 <b>A Yes.</b>	
4   through a few things here. We've got -- go to		4   Q And that is, what, a gamma reference	
5   page -- you can pull it up, if you want to.		5   controller 300, correct?	
6   Exhibit 3, make it simple, Exhibit 3. We're going		6 <b>A Yes. That's correct.</b>	
7   to look at row 2, looking at the summary of the		7   Q All right. And then gamma reference	
8   invention. And it says the invention is a		8   controller, it comprises a programming engine or	
9   programmable buffer integrated circuit, which can		9   interface and a multiplexer, programmable analog	
10   be programmed to output a set of gamma correction		10   floating gate memory cells through drivers,	
11   reference voltages to be used in LCDs. Once		11   correct?	
12   programmed, the buffer will continuously output		12 <b>A That's correct.</b>	
13   the program value, the power is removed, and it's		13   Q All right. And then, we also have in	
14   a voltage value that is stored in nonvolatile		14   here, we've got a Figure 6 as well?	
15   programmable memory, gamma correction is retained.		15 <b>A Yeah.</b>	
16   The device incorporates program interface to allow		16   Q All right. So I -- so let's look at,	
17   the programming of the buffer outputs to the		17   going to '788, let's look at claim, we're going to	
18   desired values during manufacturing and testing of		18   go to column 7. And we're going to look at some	
19   the panel. Multiple sets of gamma values can be		19   of the claim language here. Look at claim	
20   programmed and stored to provide optimized gamma		20   limitation 1A. And we're going to look at claim	
21   correction curves for different users or		21   limitation 1E.	
22   application requirements.		22 <b>A Okay.</b>	
23       Did I read that correctly?		23   Q All right. Claims limitation 1a says	
24 <b>A I think so. Yes.</b>		24   "Providing said display with gamma reference	
25   Q And earlier, you stated, when you gave		25   control capability, which is electronically	
	58		60
1   a general summary of the '305 and the '788, you		1   reprogrammable and nonvolatile."	
2   said that the '305, at least, had a gamma		2       And we have claim 1e. "Storing said	
3   reference on the TFT panel, correct?		3   gamma reference voltage level and said gamma	
4       That's what you stated, right?		4   reference control capability."	
5 <b>A Yes.</b>		5       Looking at this, this general	
6   Q All right.		6   discussion about specification, trying to get from	
7 <b>A Because the field of invention is the</b>		7   you -- understand from you. Is that -- is it	
8 <b>TFT and the liquid contrast -- yeah, okay. And</b>		8   possible that that providing said display with	
9 <b>that is more particularly to TFT. But the</b>		9   something, can that providing said display, can	
10 <b>restriction to TFT is not necessarily. The LCD</b>		10   that gamma reference control capability, could	
11 <b>panel works in a similar way.</b>		11   that be the integrated circuit that's discussed in	
12   Q All right. So, what we're looking at		12   the specification?	
13   is we kind of agree it is at least some type of		13   MR. JOHNSON: Objection to form.	
14   programmable buffer, integrated circuit that can		14   Q Specifically, the circuit of Figure 2	
15   be used in an LCD panel, generally?		15   and the circuit of Figure 6? I'm sorry, Figure 3.	
16 <b>A Yes, that's correct.</b>		16   My apologies, Figure 3 and Figure 6. I mean, you	
17   Q And it can be programmed to output a		17   agree the summary of inventions, as you stated, is	
18   set of gamma correction reference voltages to be		18   a programmable buffer-integrated circuit, which	
19   used in those panels, right?		19   can be programmed to output a set of gamma	
20 <b>A Yes. That's correct.</b>		20   correction references to be used in a liquid	
21   Q Okay. So I just want to go back. We		21   crystal display, which is a panel.	
22   have some embodiments in here, too. You talked		22 <b>A Yes. That, I agree. But let me now</b>	
23   about some of the embodiments. You talked		23   just read the question described here in my	
24   about -- you know, talked about Figure 2. In		24   report -- declarations.	
25   Figure 2, it was an architectural design. And you		25 <b>If you look at -- I describe this in my</b>	

Transcript of Paul S. Min, Ph.D.

17 (65 to 68)

Conducted on June 12, 2025

65

1 the wording itself, gamma reference control  
 2 capability, it has something to do with the  
 3 control in there, right? Storing some values,  
 4 that is not the entirety of the control. So to  
 5 me, reading this terminology, it has to do  
 6 something more than this, but what is required is  
 7 here. So I don't know where the boundary is.

8 Am I okay if I'm just to have, like, a  
 9 nonvolatile storage, like a, you know, analog  
 10 cells or even the flash memory stored at value?

11 Is that good enough?

12 Q It could be, right, Dr. Min?

13 A But then, it says the term, itself, it  
 14 says, okay, so, here, "Method of calibrating  
 15 liquid crystal display to desired gamma curve to  
 16 compensate for the panel to panel manufacturing  
 17 variations comprising the steps."

18 So in the context of the claim  
 19 language, claim 1 as a whole, the gamma reference  
 20 control capability, to a POSA, should do something  
 21 more than this, just than storing the value. That  
 22 doesn't have the control aspect of it.

23 So I don't know the boundary of this  
 24 claim term. And it does not really say anything  
 25 about the structure in the claim 1.

1 Like, gamma reference controller, including the  
 2 program interface.

3 And the program interface part comes  
 4 from the fact that inconsistency between the  
 5 Figures 2 and 3 and 6. So where does the  
 6 programming interface belong to? They are  
 7 different. And so, using the programming, the  
 8 Figure 2, the proposed construction is what I have  
 9 described earlier on, that's shown in my report,  
 10 under the heading of gamma reference control  
 11 capability.

12 Q All right. So, Dr. Min, is your  
 13 problem with this term is the fact that it's just  
 14 called gamma reference control capability? You're  
 15 just not comfortable with the name?

16 MR. JOHNSON: Objection. Form.

17 A The name -- the name is describing  
 18 something. It has a -- it's some kind of  
 19 capability that is related to gamma -- gamma,  
 20 what's the rest, gamma voltage controls. Gamma  
 21 reference controls. Just one second, please.  
 22 Gamma reference control capability. Yeah, gamma  
 23 reference control capability.

24 So it's not just to any capability, but  
 25 it's a capability that's described by the word,

66

1 So, if it is a means-plus-function,  
 2 then I go and take a look at it and see if there's  
 3 a structure that does this. And that's really  
 4 what I am talking about here.

5 Q Dr. Min, by any chance, did you take a  
 6 look at Innolux's IPR regarding the '788 patent,  
 7 see their positions?

8 A I did not. And, you know, that, my  
 9 opinion that I just described to you, is described  
 10 in paragraph 94. It has a -- some kind of  
 11 capability. Not just storing something, but it  
 12 has a control capability. And, to me, it's not  
 13 just to having the value. You have to do  
 14 something more.

15 And so, it goes on to say -- there's no  
 16 particular structure that just does that. So I  
 17 have to look at something more to actually provide  
 18 the capability portion. And if this is not  
 19 means-plus-function, which I'm informed to be  
 20 subject to 112F, and I could not find the  
 21 structure that actually is just recited, then I'll  
 22 just do, generally, the gamma reference control  
 23 capability. What does that mean? There are  
 24 certain disclosures that describe the structure  
 25 that describes this. Then what I found is that.

1 the claim term gamma reference control.

2 Q I see.

3 A So this is gamma reference control.

4 Q All right. I'm speaking -- you're a  
 5 person of skill in the art, so I'm going to speak  
 6 hypothetically here. So if we were to call  
 7 this -- if the claim language said providing said  
 8 display with gamma reference controller which is  
 9 electronically reprogrammable and nonvolatile,  
 10 would that be acceptable to you?

11 MR. JOHNSON: Objection. Form.

12 A Gamma reference controller? I mean,  
 13 that would be better, but I would still like to  
 14 see more description. Something that gives me, I  
 15 know the structure that is related to the  
 16 capability, as a part of a claim language, that  
 17 tells me the boundary of the claim. Controller,  
 18 integrated circuit chip, yeah, then it'll be  
 19 better. But controller, even could mean something  
 20 more than just to chips. Controller could be  
 21 something else. It could even be a software.  
 22 So -- and I have to be able to know the  
 23 scope of the claim with a reasonable clarity and  
 24 this capability does not really give me that  
 25 clarity.

68

Transcript of Paul S. Min, Ph.D.

18 (69 to 72)

Conducted on June 12, 2025

	69		71
1	Q I'm just trying to understand this. So	1	A Okay.
2	is your issue with the word "capability" that's in	2	Q I just want you to elaborate on
3	the claim?	3	paragraph 107. I'll give you a chance to look at
4	<b>A I mean, the term as a whole, gamma</b>	4	it, and then I will read through it.
5	<b>reference control capability. But capability is</b>	5	<b>A Yeah.</b>
6	<b>certainly what triggers it more than anything</b>	6	Q All right.
7	<b>else.</b>	7	<b>A I just read it.</b>
8	MR. JOHNSON: ERod, is this a good	8	Q Okay. So when you say that the term
9	stopping place, if you're going to switch gears?	9	"control circuit" is a generally understood term
10	MR. MILLER: Yeah, we can take a break.	10	10 in electrical engineering, what do you mean by
11	How long do you need, 15 minutes, ten minutes.	11	11 that statement?
12	MR. JOHNSON: Just ten minutes is fine.	12	<b>A It's some circuitry, as I mentioned to</b>
13	MR. MILLER: Okay. Off the record.	13	<b>you, that does control of some -- according to</b>
14	(Recess taken from 1:01 p.m. to	14	<b>some objective. But what I am saying in this</b>
15	1:19 p.m.)	15	<b>paragraph is as a part of -- recited as part of</b>
16	MR. MILLER: Back on the record.	16	<b>claim 1 of the '788 patent, it describes various</b>
17	BY MR. MILLER:	17	<b>requirement that the circuitry has to do, but it</b>
18	Q Dr. Min, welcome back.	18	<b>18 doesn't -- you know, I've listed all the</b>
19	<b>A Thank you.</b>	19	<b>19 possible -- possibilities that could be the</b>
20	Q We're going to talk about the term	20	<b>20 control circuit. So it doesn't give me the clear</b>
21	"control circuit."	21	<b>21 idea as to what is the scope of this claim 1.</b>
22	All right. On page -- just jump around	22	<b>22 That's what I'm trying to say here.</b>
23	here. I'll just ask you, Dr. Min, you say that	23	Q Based upon your reading of the claim 1
24	the term "control circuit" is a term that's	24	24 of your '788 patent and your reading as it
25	generally understood in electrical engineering.	25	25 pertains to control circuit, would you identify
	70		72
1	What do you mean by that?	1	here these four things, these are the four things
2	<b>A You're referring to paragraph 102?</b>	2	2 that you -- that it could possibly refer to?
3	<b>Could you --</b>	3	<b>A Yeah.</b>
4	Q If you want to know the specific	4	Q Okay. Which was number 1. The on-chip
5	paragraph --	5	program interface of the gamma reference voltage
6	<b>A Yeah.</b>	6	generator, ICs, or integrated circuits?
7	Q -- we can talk about paragraph 107.	7	<b>A Yes.</b>
8	<b>A 107.</b>	8	Q Number 2, gamma reference generator
9	Q Or I can scratch that question, just	9	integrated circuit, themselves, which, for
10	ask another question.	10	example, the AG 1A1A, are to be an external
11	What is a control circuit? You, as a	11	device, like PC-connected for testing or
12	professor, what is a control circuit?	12	calibration, which might also embody the means for
13	<b>A It's a circuitry that controls</b>	13	13 executing a predetermined algorithm. You've got
14	<b>something, whatever that underlying objective of</b>	14	14 4, some combination of these and specific subparts
15	<b>the control is.</b>	15	15 thereof.
16	Q Is -- would you say that a control	16	Right?
17	circuit is a structure?	17	<b>A Yes.</b>
18	<b>A It is a structure because it's a</b>	18	Q That's your understanding?
19	<b>circuit. So, when I hear the term "control</b>	19	<b>A I listed -- as I was reading the term,</b>
20	<b>circuit," it has some boundary that</b>	20	<b>20 and this came to my mind, saying that any of this,</b>
21	<b>21 (indiscernible). It cannot be, like, a</b>	21	<b>21 number 4 is sort of like, any combination or some</b>
22	<b>22 (indiscernible) period, it's a circuit.</b>	22	<b>22 subpart. So it's just very unclear.</b>
23	Q And we can go to paragraph 107.	23	Q And these four points that you have
24	<b>A Okay.</b>	24	24 here on page 4, paragraph 107, was this based on
25	Q I'll just let you review paragraph 107.	25	25 your understanding of the specification?

Transcript of Paul S. Min, Ph.D.

19 (73 to 76)

Conducted on June 12, 2025

	73		75
1     A Well, yeah, part, because here, in '788		1 correction. So this is a particular term that, I	
2 patent, it talks about the method of calibrating a		2 think, '788 patent is using. But I think one -- I	
3 liquid crystal display. So, you know, we're		3 know what gamma correction is.	
4 talking about some form of making an adjustment of		4 Q How about voltage levels? You have	
5 this LCD to, you know, fit the, you know, the		5 heard the term voltage levels?	
6 gamma to the -- the gamma curve. So, yes, it's		6 A Sure.	
7 also coming from the specification because, you		7 Q And voltage levels -- can voltage	
8 know, AG 1A1A is used as an example in, like,		8 levels be stored as -- can that be stored as	
9 figures.		9 digital data?	
10       So 4 and 5 relate -- I'm sorry, 4A and		10 A In the general context, yes.	
11 4B, and it's describing the chip, AG 1A1A.		11       But not as recited in this claim 1,	
12       So all this, based on the reading of		12 because you are talking about this gamma reference	
13 the patent, and trying to figure out what the		13 voltage, none of it is actually on the column,	
14 scope of the claim 1 is, and I come up with all		14 it's actually there. And that's where the gamma	
15 this possible different scenarios.		15 reference voltage levels are first recited.	
16     Q All right. Thank you.		16       And then here, in 1e, it says storing	
17     Q And, Dr. Min, again, I'm going to ask.		17 said gamma reference voltage level. So it's the	
18 So the means for executing a predetermined		18 same one, not digital version of that, what is	
19 algorithm, by any chance, did you consider		19 applied to that column. The same gamma reference	
20 Immolux's position taken in its IPR petition in		20 voltage level is stored in this gamma reference	
21 drafting this section?		21 control capability.	
22 A Not personally, no.		22       So whatever is applied on the columns	
23 Q And I'm going to ask this, so maybe I'm		23 of a display panel is also stored, the same one,	
24 going to go into gamma reference voltage level on		24 and it has to be the analog value because you	
25 page 51.		25 cannot really apply that voltage level, not the	
	74		76
1     A Yes.		1 digital representation of the voltage level, but	
2     Q Can gamma reference voltage levels, can		2 actual voltage is applied to that column.	
3 they be stored as digital data?		3     Q And voltage levels have digital	
4     A No. I think if you read the claim, so		4 representation?	
5 as a part of claim 1 -- so this gamma reference		5     MR. JOHNSON: Object to form.	
6 voltage level is coming from stored in the gamma		6     A I mean, if you have a digital	
7 reference control capability, which, according to		7 representation before you apply to the column, you	
8 1a, is electrically reprogrammable and		8 have to be converted to analog value. I mean,	
9 nonvolatile. But this term, it's recited here in		9 that's what drives the column of the display	
10 claim element 1c of the '788 patent, varying gamma		10 panel.	
11 reference voltage level on columns of a set		11     MR. MILLER: Thank you, Dr. Min.	
12 displayable -- set displayed by a control circuit,		12     Counsel, I pass the witness.	
13 where set control circuit is separate from the		13     MR. JOHNSON: I have no questions at	
14 display.		14 this time.	
15       And so, you're actually varying the		15     MR. MILLER: Okay.	
16 voltage level right at the -- on the columns of a		16     THE WITNESS: Thank you.	
17 display panel. So, you know, that voltage level		17     MR. MILLER: Thank you very much again,	
18 has to have an analog voltage in order to vary		18 Dr. Min, for your time.	
19 right there, and that cannot come from a digital		19     THE WITNESS: Thank you. Good to meet	
20 nonvolatile storage cell.		20 you.	
21     Q Are you familiar with the term "gamma		21     (Off the record at 1:31 p.m.)	
22 reference voltage levels," outside of the context		22	
23 of the '788 patent?		23	
24 A I know what gamma correction is, and		24	
25 the voltage associated with that, the gamma		25	

Transcript of Paul S. Min, Ph.D.

20 (77 to 80)

Conducted on June 12, 2025

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1 CERTIFICATE OF REPORTER - NOTARY PUBLIC

2 I, JUDITH E. BELLINGER, RPR, CRR, CSR,

3 the officer before whom the foregoing deposition

4 was taken, do hereby certify that the foregoing

5 transcript is a true and correct record of the

6 testimony given; that said testimony was taken by

7 me and thereafter reduced to typewriting under my

8 direction; that reading and signing was not

9 requested; and that I am neither counsel for,

10 related to, nor employed by any of the parties to

11 this case and have no interest, financial or

12 otherwise, in its outcome.

13 IN WITNESS WHEREOF, I have hereunto set

14 my hand and affixed my notarial seal this 23rd day

15 of June, 2025.

16 My Commission Expires: November 3, 2028

17

18

19 Judith E. Bellinger

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